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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPELLANT	:	Andreas GOEKE
SERIAL NO.	:	10/534338
FILED	:	10.May.2005
FOR	:	**IMPROVEMENTS IN OR RELATED TO ORGANIC COMPOUNDS**
ART UNIT	:	1796
EXAMINER	:	Michael F. PEPITONE

Per Telefax: 571 273-8300

13.October.2009

MAIL STOP APPEAL BRIEF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANT'S REPLY BRIEF PURSUANT TO 37 CFR § 41.41

SIR:

This Reply Brief is in response to the Examiner's Answer mailed August 20, 2009. For the reasons set forth in the Appeal Brief and below, the Examiner's rejections are in error and should be reversed.

(1) **STATUS OF CLAIMS**

Claims 1-14 are pending.

Claims 1 and 3-8 are on appeal.

Claims 2 and 9-14 are objected to.

Claims 1 and 3-8 are rejected.

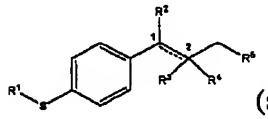
(2) STATUS OF AMENDMENTS

The Amendment After Final Rejection filed on March 2, 2009 has been entered. There are no outstanding amendments.

(3) SUMMARY OF THE CLAIMED SUBJECT MATTER

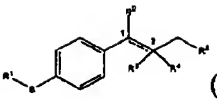
The present application contains two independent claims, viz., claims 1 and 8. Claims 3-7 depend, directly or indirectly, from claim 1.

Independent claim 1 relates to a flavour or fragrance compound (see ¶¶0024, 0025, 0036, 0037) according to formula I having spicy and anisic odour notes (see ¶¶ 0001, 0006), wherein the bond between C_1 and C_2 is a single bond (see ¶0008), R^1 is methyl, ethyl, *i*-propyl, *n*-propyl (see ¶0009). R^2 and R^3 are independently hydrogen or methyl (see 0010), or R^2 and R^3 taken together is a divalent radical $(CH_2)_n$, $C(CH_3)_2$, or $CH(CH_3)$ which forms a cycloalkane ring together with the carbon atoms to which it is attached (see ¶0011). R^4 and R^5 are independently hydrogen or methyl (see 0012), or R^4 and R^5 taken together is a divalent radical $(CH_2)_n$, $(CH_2)_{n-1}CH(CH_3)_2$, or $(CH_2)_{n-1}CH(CH_3)$ which forms a cycloalkane ring together with the carbon atoms to which it is attached (see ¶0013), n is an integer of 1, 2, 3, or 4 (see ¶0014), and wherein at least one cycloalkane ring is present (see 0015). Formula I is represented by



(see the Abstract, ¶¶0007, 0040).

Independent claim 8 relates to a compound of formula I, wherein the bond between C_1 and C_2 is a single bond (see ¶0008), R^1 is methyl, ethyl, *i*-propyl, *n*-propyl (see ¶0009). R^2 and R^3 are independently hydrogen or methyl (see ¶0010), or R^2 and R^3 taken together is a divalent radical $(CH_2)_n$, $C(CH_3)_2$, or $CH(CH_3)$ which forms a cycloalkane ring together with the carbon atoms to which it is attached (see ¶0011). R^4 and R^5 are independently hydrogen or methyl (see 0012), or R^4 and R^5 taken together is a divalent radical $(CH_2)_n$, $(CH_2)_{n-1}CH(CH_3)_2$, or $(CH_2)_{n-1}CH(CH_3)$ which forms a cycloalkane ring together with the carbon atoms to which it is attached (see ¶0013), n is an integer of 1, 2, 3, or 4 (see ¶0014), and wherein at least one cycloalkane ring

is present (see ¶0015). Formula I is represented by  (see the Abstract, ¶¶0007, 0040, 0041)

(4) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

There are two grounds of rejection to be reviewed on appeal:

A. Whether claims 1, 3, 4, 6 and 7 are unpatentable under 35 USC 103(a) over U.S. Patent No. 5,387,718 to Köhler et al. (hereinafter "Köhler") and whether claims 8 is unpatentable under 35 USC 103(a) over Köhler; and

B. Whether claim 5 is unpatentable under 35 USC 103(a) over Köhler in view of EP 1264547 to Grab et al. (hereinafter "Grab").

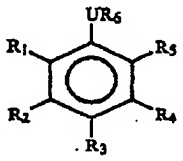
(5) ARGUMENT

As will be detailed below, Köhler does not teach or suggest all of the features recited in flavour or fragrance compound claim 1, Köhler does not teach or suggest all of the features recited in compound claim 8; and Köhler and Grab do not teach or suggest all of the features recited in fragrance application claim 5

The Examiner makes a number of errors in responding to Appellants' arguments that claims 1, 3, 4, 6 and 7 and claim 8 would not have been obvious over Köhler

Claims 1, 3, 4, 6 and 7 were rejected under 35 USC 103(c) as allegedly being unpatentable over Köhler; and claim 8 was rejected under 35 USC 103(c) as allegedly being unpatentable over Köhler.

The Examiner continues the error made throughout the prosecution by asserting that claims 1, 3, 4, 6, 7 and 8 are obvious in view of Köhler. Specifically, the Examiner continues the error by alleging that Köhler discloses:

> Alkylphenyl alkyl ethers as considered herein comprise the oxygen ethers and the sulfur-derivative thioethers as well.
>
> The phenyl ethers have the following formula:
>
> 
>
>
> where U represents O or S; and
>
> R_1–R_6 each independently represent an alkyl or aryl group, but R_1–R_5 may each independently represent a functional group other than these, including, e.g., but not limited to, —COOR, —NO_2, —NH_2, —O—CH_2—CH_2—OH, —OH, —CHO, or -halogen; further
>
> R_1–R_5 may be bridged by suitable bifunctional substituents, such as, e.g., —$(CH_2)_x$—, or —$(CH_2)_x$—Z—$(CH_2)_y$— (where Z represents a hetero atom; x=0–7, and y=0–7), or preferably unsaturated substituents such as are characteristic of anellated ring systems, e.g. (but not limited to) naphthyl, phenanthryl, anthracenyl, quinolyl, isoquinolyl, or indolyl.

While the preferred embodiments {ex. 1-2 and 4-7} do not specifically depict the structures of instant claims 1 and 8, the general formula discloses such compounds. If one of ordinary skill in the art is able to "at once envisage" the specific compound within the generic chemical formula, the compound is anticipated. One of ordinary skill in the art must be able to draw the structural formula or write the name of each of the compounds included in the generic formula before any of the compounds can be "at once envisaged." One may look to the preferred embodiments to determine which compounds can be anticipated. *In re Petering*, 301 F.2d 676, 133 USPQ 275 (CCPA 1962). The reference must be considered for all that it discloses and must not be limited to preferred embodiments [see MPEP 2123].

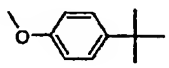
; and

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

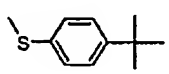
The Examiner also alleges that spicy and anisic odor notes would implicitly be achieved from structures corresponding to instant claim 1.

The Examiner additionally erroneously alleges that:

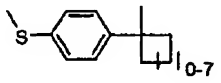
Köhler *et al.* (US '718) discloses *p-tert*-butylphenyl methyl ether Example 1 (5:53-68), which is depicted below.



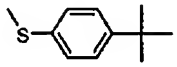
From the general structure (1:15-42) and example 7 (6:48-64), substitution of oxygen with sulfur is disclosed, affording the compound depicted below {R_3 = C_4 alkyl}.



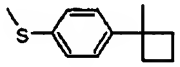
Köhler *et al.* (US '718) discloses the C_{1-6} alkyl groups {R_3} may be bridged by suitable bifunctional substituents, such as $-(CH_2)_x-$ with x = 0-7 (1:35-38), affording the bridged alkyl structure depicted below.



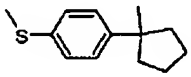
With: x = 0;



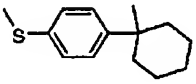
x = 1 yields an alkyl group bridged by a methylene $-(CH_2)-$ moiety, resulting in a fused cyclobutyl ring;



x = 2 yields an alkyl group bridged by an ethylene $-(CH_2CH_2)-$ moiety, resulting in a fused cyclopentyl ring;



x = 3 yields an alkyl group bridged by an propylene $-(CH_2CH_2CH_2)-$ moiety, resulting in a fused cyclohexyl ring;



etc. The *tert*-butyl moiety was used in the above examples for convenience, but it is noted that R_3=C_{1-6} alkyl (2:40-68), allowing a longer C_{3-6} alkyl moiety to be used in place of the C_4 moiety.

Moreover, the Examiner additionally erroneously alleges that:

> "Köhler *et al.* (US '718) discloses alkylphenyl alkyl thioethers {compounds from the general formula} to be used as fragrances (5:42-45). Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990) [see MPEP 2112.01].

Appellant respectfully disagree with the allegations by the Examiner.

In addition to the arguments presented in the Appellant's Brief on Appeal filed May 18, 2009, Appellant submits that the Examiner has misinterpreted the meaning of the chemical term "bridged".

To a skilled artisan, the chemical term "bridged" is clearly defined as something which connects two different parts (such as one residue alone, for example, R_3) instead of having the same starting and ending points, which is incapable of building a bridge, as interpreted by the Examiner (see page 8 of the Examiner's Answer).

In support for Appellant's interpretation of the chemical term "bridged", Appellant cites Attachment A ("Nomenclature of Organic Chemistry," International Union of Pure and Applied Chemistry, Organic Chemistry Division, Commission on Nomenclature of Organic Chemistry, 1979 Edition, pages 31-37). Attachment A discloses that the chemical term "bridge" refers to a valence bond or an atom or an unbranched chain of atoms connecting two different parts of a molecule whereby two tertiary carbon atoms connected through the bridge are termed "bridgeheads" (see the footnote on page 31 of Attachment A).

Additionally, Appellant cites Attachment B ("The Vocabulary of Organic Chemistry," Organic Division, Department of Chemistry, University of Cincinnati, 1980, pages 52 and 53).

Attachment B discloses that the chemical term "bridge" refers to a bond, an atom or a chain of atoms joining bridgehead carbons (see page 52 of Attachment B). Moreover, Attachment B disclose Figures 3.250 and 3.270 which each illustrate molecules having three bridges that having bonds connecting two different parts of the molecule (see pages 52 and 53 of Attachment B). Thus, the teachings of Attachment B are in accordance with the teachings of Attachment A.

Further, Appellant cites Attachment C (IUPAC Gold Book accessible at http://goldbook.iupac.org/B00736.html, 1997). Attachment C discloses that the chemical term "bridge" refers to a valence bond or an atom or an unbranched chain of atoms connecting two different parts of a molecule whereby two tertiary carbon atoms connected through the bridge are termed bridgeheads (see Attachment C). Thus, the teachings of Attachment C are also consistent with the teachings of Attachments A and B.

Moreover, Appellant submits that even Köhler discloses a meaning of the chemical term "bridge" that is in accordance with the teachings of Attachments A-C. Specifically, col. 1, lines 35-42 of Köhler discloses:

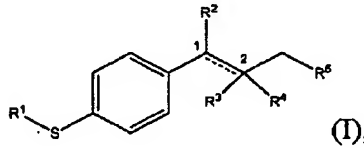
> **R_1-R_5 may be bridged by suitable bifunctional substituents, such as, e.g., —$(CH_2)_x$—, or —$(CH_2)_x$—Z—$(CH_2)_y$— (where Z represents a hetero atom; x=0–7, and y=0–7), or preferably unsaturated substituents such as are characteristic of anellated ring systems, e.g. (but not limited to) naphthyl, phenanthryl, anthracenyl, quinolyl, isoquinolyl, or indolyl.**

Appellant submits that Köhler's disclosure that R_1-R_5 may be bridged by suitable bifunctional substituents or preferably unsaturated substituents provides further support for Appellant's interpretation that the chemical term "bridge" refers to a valence bond or an atom or an unbranched chain of atoms connecting two different parts of a molecule whereby two tertiary carbon atoms connected through the bridge are termed bridgeheads.

In view of Attachments A-C and Köhler, Appellant submits that the presently claimed flavour or fragrance compound of claim 1 and the compound of claim 8 are not taught or suggest by Köhler as alleged by the Examiner.

Thus, Appellant submits that Köhler does not teach or suggest compounds wherein R_3 alone is alkyl having a fused C_{0-7} cycloalkyl ring as alleged by the Examiner. Instead, Köhler fails to teach or suggest any cycloalkyl whatsoever. Additionally, the Appellant maintains the submission that the Examiner errs by misinterpreting Köhler and mistakenly combining features of Köhler which are clearly not combinable to allegedly achieve the presently claimed flavour or fragrance compound.

Therefore, Köhler does not teach or suggest a flavour or fragrance compound according to formula I (as required by claim 1) and a compound of formula I (as recited in claim 8)



(I),

wherein the bond between C_1 and C_2 is a single bond, R^1 is methyl, ethyl, *i*-propyl, *n*-propyl; R^2 and R^3 are independently hydrogen or methyl, or R^2 and R^3 taken together is a divalent radical $(CH_2)_n$, $C(CH_3)_2$, or $CH(CH_3)$ which forms a cycloalkane ring together with the carbon atoms to which it is attached, R^4 and R^5 are independently hydrogen or methyl, or R^4 and R^5 taken together is a divalent radical $(CH_2)_n$, $(CH_2)_{n-1}CH(CH_3)_2$, or $(CH_2)_{n-1}CH(CH_3)$ which forms a cycloalkane ring together with the carbon atoms to which it is attached, n is an integer of 1, 2, 3, or 4, and wherein at least one cycloalkane ring is present as required by independent claims 1 and 8, respectively.

In view of the foregoing remarks, Appellant disagrees with the Examiner's position, traverses the Examiner's rejection and asserts that the Examiner has not met the proper burden of

proof to present and maintain the rejection; such are simply unsupported by the facts for the reasons noted above. Rather, Appellant contends that the Examiner's grounds of rejection is at, at best, a hindsight reconstruction, using Appellant's claims as a template to reconstruct the invention by picking and choosing amongst isolated disclosures from the present application and Köhler. This is impermissible under the law. Accordingly, reconsideration of the propriety of the rejections of claims 1, 3, 4 and 6-8 and their withdrawal is respectfully requested.

(6) CONCLUSION

For all of the reasons discussed above, it is respectfully submitted that the rejection is in error and that claims 1-14 are in condition for allowance. For all of the above reasons, Appellant respectfully requests this Honorable Board to reverse the rejection of claims 1 and 3-8.

CONDITIONAL AUTHORIZATION FOR FEES

Should any further fee be required by the Commissioner in order to permit the timely entry of this paper, the Commissioner is authorized to charge any such fee to Deposit Account No. 14-1263.

Respectfully Submitted;

Andrew N. Parfomak, Esq. Date: 13 October 2009

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CERTIFICATE OF TELEFAX TRANSMISSION UNDER 37 CFR 1.8

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Allyson Ross — 13 October 2009

Allyson Ross — Date

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(7) EVIDENCE APPENDIX

Attachments A-C

INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY
ORGANIC CHEMISTRY DIVISION
COMMISSION ON NOMENCLATURE OF ORGANIC CHEMISTRY

NOMENCLATURE OF ORGANIC CHEMISTRY

Sections A, B, C, D, E, F and H

1979 Edition

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Rule A–28. Radical Names for Fused Cyclic Systems with Side Chains

28.1—Radicals formed from hydrocarbons consisting of polycyclic systems and side chains are named according to the principles of the preceding rules.

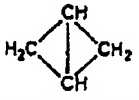
BRIDGED HYDROCARBONS

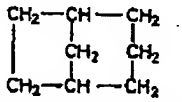
EXTENSION OF THE VON BAEYER SYSTEM

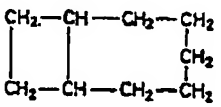
Rule A–31. Bicyclic Systems

31.1—Saturated alicyclic hydrocarbon systems consisting of two rings only, having two or more atoms in common, take the name of an open chain hydrocarbon containing the same total number of carbon atoms preceded by the prefix "bicyclo-". The number of carbon atoms in each of the three bridges* connecting the two tertiary carbon atoms is indicated in brackets in descending order.

Examples:

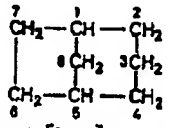

Bicyclo[1.1.0]butane

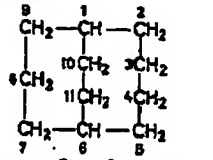

Bicyclo[3.2.1]octane


Bicyclo[5.2.0]nonane

31.2—The system is numbered commencing with one of the bridgeheads, numbering proceeding by the longest possible path to the second bridgehead; numbering is then continued from this atom by the longer unnumbered path back to the first bridgehead and is completed by the shortest path from the atom next to the first bridgehead.

Examples:


Bicyclo[3.2.1]octane

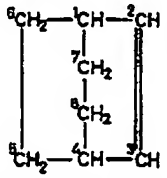

Bicyclo[4.3.2]undecane

Note: Longest path 1, 2, 3, 4, 5
Next longest path 5, 6, 7, 1
Shortest path 1, 8, 5

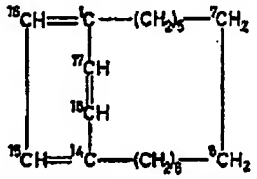
* A bridge is a valence bond or an atom or an unbranched chain of atoms connecting two different parts of a molecule. The two tertiary carbon atoms connected through the bridge are termed "bridgeheads".

31.3—Unsaturated hydrocarbons are named in accordance with the principles set forth in Rule **A-11.3**. When after applying Rule A-31.2 a choice in numbering remains unsaturation is given the lowest numbers.

Examples:



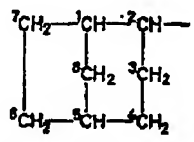
Bicyclo[2.2.2]oct-2-ene



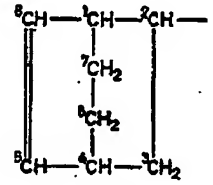
Bicyclo[12.2.2]octadeca-1(16),14,17-triene
or Bicyclo[12.2.2]octadeca-14,16(1),17-triene
(See Rule A-3.1 for double locants)

31.4—Radicals derived from bridged hydrocarbons are named in accordance with the principles set forth in Rule **A-11**. The numbering of the hydrocarbon is retained and the point or points of attachment are given numbers as low as is consistent with the fixed numbering of the saturated hydrocarbon.

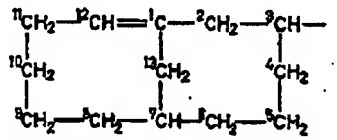
Examples:



Bicyclo[3.2.1]oct-2-yl



Bicyclo[2.2.2]oct-5-en-2-yl



Bicyclo[5.5.1]tridec-1(12)-en-3-yl
or Bicyclo[5.5.1]tridec-12(1)-en-3-yl
(See Rule A-3.1 for double locants)

Rule A-32. Polycyclic Systems

32.11—Cyclic hydrocarbon systems consisting of three or more rings may be named in accordance with the principles stated in Rule **A-31**.

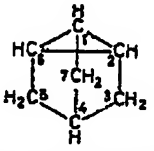
The appropriate prefix "tricyclo-", "tetracyclo-", *etc.*, is substituted for "bicyclo-" before the name of the open-chain hydrocarbon containing the same total number of carbon atoms. Radicals derived from these hydrocarbons are named according to the principles set forth in Rule A–31.4.

32.12—A polycyclic system is regarded as containing a number of rings equal to the number of scissions required to convert the system into an open-chain compound.

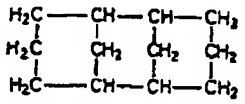
32.13—The word "cyclo" is followed by brackets containing, in decreasing order, numbers indicating the number of carbon atoms in:

the two branches of the main ring,
the main bridge,
the secondary bridges.

Examples:



Tricyclo[2.2.1.0^{2,6}]heptane



Tricyclo[5.3.1.1^{4,9}]dodecane

* For location and numbering of the secondary bridge see Rules A–32.22, A–32.23, A–32.31.

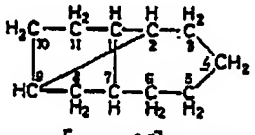
32.21—The main ring and the main bridge form a bicyclic system whose numbering is made in compliance with Rule A–31.

32.22—The location of the other or so-called secondary bridges is shown by superscripts following the number indicating the number of carbon atoms in the said bridges.

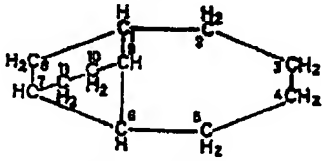
32.23—For the purpose of numbering, the secondary bridges are considered in decreasing order. The numbering of any bridge follows from the part already numbered, proceeding from the highest-numbered bridgehead. If equal bridges are present, the numbering begins at the highest-numbered bridgehead.

32.31—When there is a choice, the following criteria are considered in turn until a decision is made:

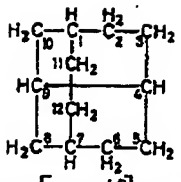
(*a*) The main ring shall contain as many carbon atoms as possible, two of which must serve as bridgeheads for the main bridge.



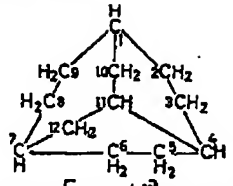
Tricyclo[5.4.0.0^{2,9}]undecane
Correct numbering



Tricyclo[4.2.1.2^{7,9}]undecane
Incorrect numbering

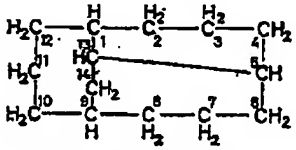


Tricyclo[5.3.2.0^{4,9}]dodecane
Correct numbering

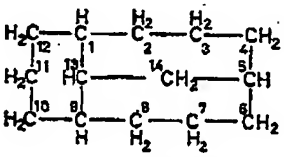


Tricyclo[5.2.3.0^{4,11}]dodecane
Incorrect numbering

(*b*) **The main bridge shall be as large as possible.**

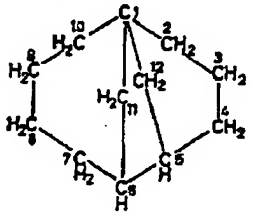


Tricyclo[7.3.2.0^{8,13}]tetradecane
Correct numbering

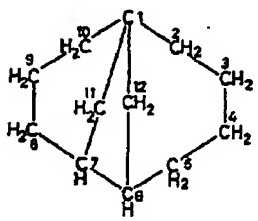


Tricyclo[7.3.1.1^{8,13}]tetradecane
Incorrect numbering

(*c*) **The main ring shall be divided as symmetrically as possible by the main bridge.**

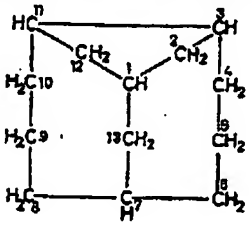


Tricyclo[4.4.1.1^{1,5}]dodecane
Correct numbering

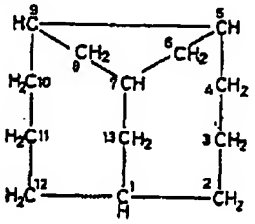


Tricyclo[5.3.1.1^{1,6}]dodecane
Incorrect numbering

(*d*) **The superscripts locating the other bridges shall be as small as possible (in the sense indicated in Rule A-2.2).**



Tricyclo[5.5.1.0^{3,11}]tridecane
Correct numbering



Tricyclo[5.5.1.0^{5,9}]tridecane
Incorrect numbering

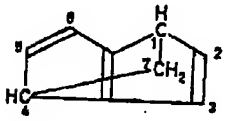
Rule A–34. Hydrocarbon Bridges

34.1—Polycyclic hydrocarbon systems which can be regarded as "*ortho*-fused" or "*ortho*- and *peri*-fused" systems according to Rule A–21 and which, at the same time, have other bridges*, are first named as "*ortho*-fused" or "*ortho*- and *peri*-fused" systems. The other bridges are then indicated by prefixes derived from the name of the corresponding hydrocarbon by replacing the final "-ane", "-ene", *etc.*, by "-ano", "-eno", *etc.*, and their positions are indicated by the points of attachment in the parent compound. If bridges of different types are present, they are cited in alphabetical order.

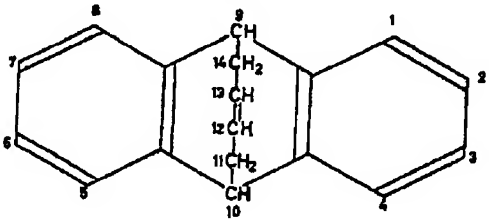
Examples of bridge names:

Butano	—CH_2—CH_2—CH_2—CH_2—
Benzeno (*o*-, *m*-, *p*-)	—C_6H_4—
Ethano	—CH_2—CH_2—
Etheno	—CH=CH—
Methano	—CH_2—
Propano	—CH_2—CH_2—CH_2—

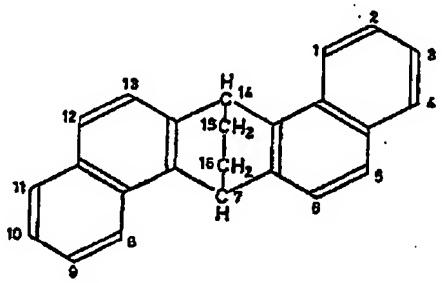
Examples:



1,4-Dihydro-1,4-methanopentalene



9,10-Dihydro-9,10-[2]butenoanthracene

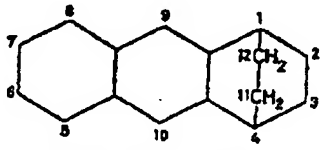


7,14-Dihydro-7,14-ethano-dibenz[*a*,*h*]anthracene

* The term "bridge", when used in connection with an "*ortho*-fused" or "*ortho*- and *peri*-fused" polycyclic system as defined in the note to Rule A–31.1 also includes "bivalent cyclic systems".

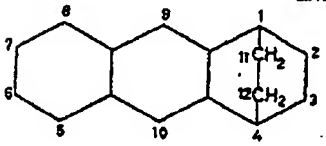
34.2—The parent "*ortho*-fused" or "*ortho*- and *peri*-fused" system is numbered as prescribed in Rule A-22. Where there is a choice, the position numbers of the bridgeheads should be as low as possible. The remaining bridges are then numbered in turn starting each time with the bridge atom next to the bridgehead possessing the highest number.

Example:

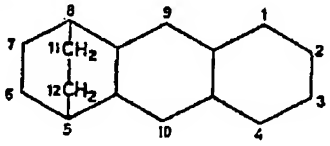


Perhydro-1,4-ethano-anthracene

not

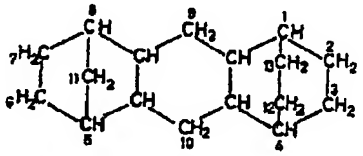


or



34.3—When there is a choice of position numbers for the points of attachment for several individual bridges, the lowest numbers are assigned to the bridgeheads in the order of citation of the bridges and the bridge atoms are numbered according to the preceding rule.

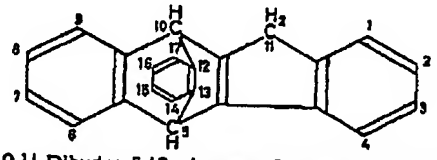
Example:



Perhydro-1,4-ethano-5,8-methanoanthracene

34.4—When the bridge is formed from a bivalent cyclic hydrocarbon radical, low numbers are given to the carbon atoms constituting the shorter bridge and numbering proceeds around the ring.

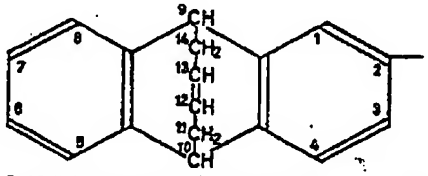
Example:



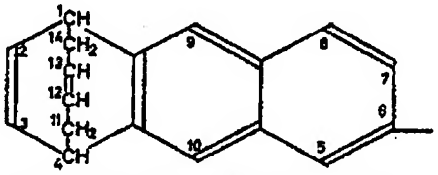
10,11-Dihydro-5,10-*o*-benzeno-5*H*-benzo[*b*]fluorene

34.5—Names for radicals derived from the bridged hydrocarbons considered in Rule A–34.1 are constructed in accordance with the principles set forth in Rule A–24. The abbreviated radical names naphthyl, anthryl, phenanthryl, naphthylene, etc., permitted as exceptions to Rules A–24.2 and A–24.4, are replaced in such cases by the regularly formed names naphthalenyl, anthracenyl, phenanthrenyl, naphthalenediyl, *etc.*

Examples:



9,10-Dihydro-9,10-[2]butenoanthracen-2-yl

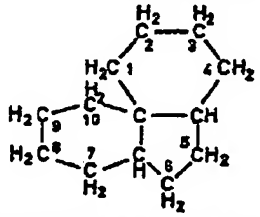


1,4-Dihydro-1,4-[2]butenoanthracen-6-yl

SPIRO HYDROCARBONS

A " spiro union " is one formed by a single atom which is the only common member of two rings. A " free spiro union " is one constituting the only union direct or indirect between two rings*. The common atom is designated as the " spiro atom ". According to the number of spiro atoms present, the compounds are distinguished as monospiro-, dispiro-, trispiro-compounds, *etc.* The following rules apply to the naming of compounds containing free spiro unions.

* An example of a compound where the spiro union is *not* free is:



This compound is named by previous rules as dodecahydrobenz[*e*]indene.

ATTACHMENT B

The Vocabulary of Organic Chemistry

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Preface

The purpose of this book is to identify the fundamental vocabulary of c ganic chemistry and then to present concise, accurate definitions, with exampl where appropriate, for the words and concepts that make up this vocabular This book is not intended to be a dictionary either in form or content. It is not listing of organic compounds, their structures, and nomenclature except whe these illustrate particularly important specific compounds or classes of cor pounds. The book is organized into chapters, and both the chapters and the m terial within each chapter are placed in a sequence that makes pedagogical sen to the authors. This approach generated a book in which related terms and co cepts appear in close proximity to one another and hence fine distinctions b come more understandable.

The idea for this book grew out of discussions by the Organic Division men bers of the Department of Chemistry of the University of Cincinnati on how t cope with the mass of material that is offered to students in the elementa course in organic chemistry. Recent books intended for this course typicall consist of 1000 pages of text and 2500 index entries. It is hopelessly impossibl to cover this amount of material during the time allotted for this purpose. In structors in the course are constantly plagued by the irritating but not unreasor able question asked by many students: "What are we expected to know?" One always tempted to reply with another question, "What is knowledge withou understanding?" It is our hope that this book, by defining terms and concept provides both. The earlier book by Saul Patai, *Glossary of Organic Chemistr* (John Wiley & Sons, 1962), attempted to address this problem, but the presen book is completely different in organization and purpose.

In the very early stages of the work it became apparent that no general agree ment could be reached by the authors either on the specific terms that student at a particular point in their education should be required to know and unde stand, or on the level and extent of explanation and elaboration of these term If the selection and level were aimed primarily at students in the undergraduat chemistry program, the book would be too limiting; if the selections and leve were aimed exclusively at the graduate student, then one of the original purpose of the book would be lost; and if the book were oriented exclusively to student and teachers, then the appeal to working professionals would be reduced. Inevit ably a compromise was reached. The authors of individual chapters were give the option of including any term or concept that could be found in the index o

3.240 Cycloalkenes
Cyclic hydrocarbons containing a double bond.

Example. 3,3-Dimethylcyclohexene, Fig. 3.240.

Figure 3.240 3,3-Dimethylcyclohexene.

3.250 Bridged Cycloalkane Hydrocarbons
Cyclic hydrocarbons containing one (or more) pairs of carbon atoms common to two (or more) rings.

Example. Bicyclo[2.2.2]octane, Fig. 3.250.

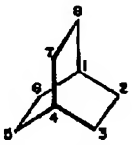


Figure 3.250 Bicyclo[2.2.2]octane.

3.260 Bridgehead Carbon Atoms
The carbon atoms common to two or more rings.

Example. The carbon atoms numbered 1 and 4, Fig. 3.250, are bridgehead carbons; in naming such compounds one of the bridgehead carbon atoms is always numbered 1.

3.270 Bridges
A bond or atom or chain of atoms joining bridgehead carbons.

Examples. In Fig. 3.250 there are three bridges, each consisting of two carbon atoms. In *trans*-bicyclo[4.4.0]decane (also called *trans*-decahydronaphthalene or

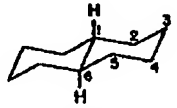


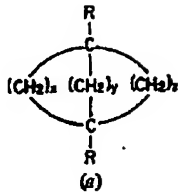
Figure 3.270 *trans*-Bicyclo[4.4.0]decane.

decalin), Fig. 3.270, there are also three bridges but in this case one of them consists of a bond only.

3.280 Angular Groups
Atoms or groups attached to bridgehead carbons.

Example. The hydrogen atoms at positions 1 and 6 in Fig. 3.270. Most commonly this nomenclature is applied to angular methyl groups in many naturally occurring compounds.

3.290 Bicyclic Compounds
Compounds containing one pair of bridgehead carbon atoms; these have the general structure shown in Fig. 3.290*a*.



(*a*)

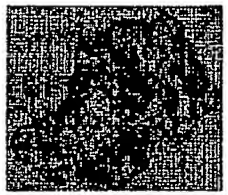
Example. Bicyclo[1.1.0]butane, Fig. 3.290*b*. The prefix bicyclo is part of the von Baeyer system of naming bridged alicyclic hydrocarbons. In this system the number of rings is equal to the minimum number of bond scissions required to convert the bridged ring system into an acyclic hydrocarbon having the same number of carbon atoms. In our example two cuts or scissions does this. Saturated, bicyclic hydrocarbons have the empirical formula C_nH_{2n-2}.

(*b*)

Figure 3.290 (*a*) General structure of bicyclo compounds; (*b*) bicyclo[1.1.0]butane.

3.300 Tricyclic Compounds
Compounds possessing either four bridgehead carbons each common to two rings or a pair of bridgehead carbons common to three rings.

Examples. Adamantane, Fig. 3.300*a*, the tetrahedral molecule whose systematic name is tricyclo[3.3.$1^{1,5}$.$1^{3,7}$]decane. The four bridgehead carbon atoms are 1, 3, 5, and 7. The derivation of the systematic name is apparant if one first



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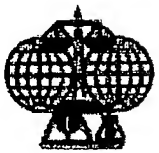
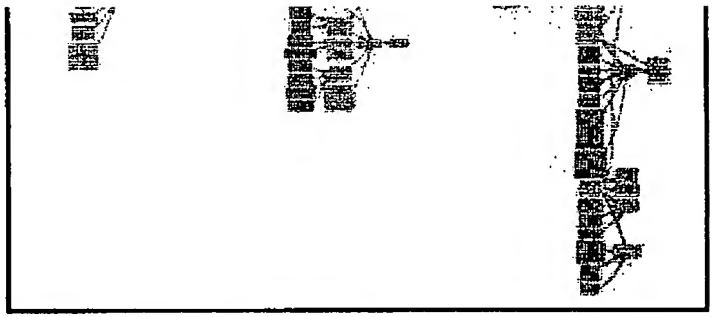


bridge

A valence bond or an atom or an unbranched chain of atoms connecting two different parts of a molecule. The two tertiary carbon atoms connected through the bridge are termed bridgeheads.

Source:
Blue Book, p. 31

Interactive Link Maps		
First Level	Second Level	Third Level
		



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